VOL. XIII. NO. 2.—BOTANICAL GAZETTE.—FEB'Y, 1888.

DR. ASA GRAY died at his home in the Botanic Garden, Cambridge, Mass., January 30, 1888. He was born November 18, 1810. The funeral services took place at Appleton Chapel, February 2. A biographical sketch, with portrait, was published in the BOTANICAL GAZETTE for January, 1886. In the March number a suitable notice will appear, prepared by one intimately associated with him.

Undescribed plants from Guatemala. II.

JOHN DONNELL SMITH.

Chrysochlamys Guatemaltecana. (§ *Tovomitopsis*).—Arboreous, branchlets terete: leaves oblanceolate, 4-9 inches long, a third as broad, shortly acuminate, narrowed acuminately to a short petiole, chief lateral veins 10-12, younger leaves aureo-punctate and delicately reticulate with free veinlets: panicle short-peduncled, 3-4 inches long, tri-quadri-trichotomous, ultimate clusters cymose, axes complanate, bracteoles triangular and concave: flowers in specimens seen pseudo-hermaphrodite; *alabasha* round-oval, half the length of pedicels; bracts 2, ovate, 1½ lines long: sepals 4, oval, nearly equal, 3 lines long: pĕtals 4, obovoid, a little exceeding sepals, like them striate and punctate: stamens effete, indefinite, concrete at base, equaling ovary, external ones shorter, filaments flat and linear-tapering: stigmas 5, cuneately oblong, confluent at base, exceeding diameter of 5-locular ovary.—Forests of Pansamalá, Depart. Alta Verapaz, alt. 3,800 feet, June, 1886. (Ex Plantis Guatemalensibus Tuerckheimianis, quas edidit John Donnell Smith, 989.)

Harpalyce rupicola.—A shrub: petioles 6-9 lines long, like the racemes ferruginous-pubescent; leaves 4-5 inches long; leaflets 11-15, oblong, retuse, rounded at base, 1 inch or less long, half as broad, terminal one the longest, diminishing to lowest pair one-half shorter and oval, at first puberulous above and aureo-atomiferous beneath, both surfaces soon glabrate and minutely reticulated, impunctate, margins revolute, petiolulate: racemes axillary or from leafless nodes in terminal panicles, nearly equaling leaves, 12-18 flowered, peduncle equaling petiole, pedicel 4 lines long: calyx tomentose, atomiferous, oblong-falcate, half an inch long: petals purple, auricled on one side; vexillar exceeding the others, 9 lines long, 7 lines broad, round-obovate, auricle minute; alar 2½ lines broad; carinal a little shorter, partly cohering: staminal sheath cleft to base; greater anthers linear-oblong, ¾ line long; others ovate, one-third as long: ovary linear, 1 locular, 6-7 ovulate.—Approaching *H. arborescens* Gray, the originals of which (Ervendberg 18, Coulter 556) in Harvard Univ. herb. differ by their coriaceous obscurely veined leaves atro-punctate beneath the close pubescence of under surface, short racemes of smaller flowers, biauriculate vexillum, smaller less heteromorphous anthers,

and habit.—Mountain cliffs near Santa Rosa, Depart. Baja Verapaz, alt. 5,000 feet, April, 1887. (Ex Pl. Guat. cit. 1210.)

Bauhinia Rubeleruziana. *(§ Casparia DC.)*—Arborescent, 10–15 feet high, rufous-tomentose: stipules and bracteoles linear-lanceolate, 2 lines long: petioles 9–15 lines long, inserted between a pair of minute subulate smooth spines; leaves membranaceous, glabrate above except midrib and margin, pubescent beneath with tomentose veins, ovate-oblong, cordate, 4–6 inches long, two-thirds as broad, 9-nerved; lobes triangular, acute, an inch or less long, sinus nearly rectangular: racemes extra-axillary, 15–20-flowered; rhachis at length an inch long, peduncle and pedicels a third shorter: flowers andro-monœcious, chiefly with abortive pistils, pendulous in the bud: calyx spathaceous, in the bud 9 lines long and 2 lines broad, tomentose, 5-denticulate by excurrent nerves: petals linear-lanceolate, spathulate, sessile, ciliate beneath, red, diminishing from the interior one 11 lines long and 2 lines broad to the exterior one a half smaller: stamens all shortly connate, each with a hirsute process on the inside near its adnation; the fertile 1, equaling petals, glabrous; the sterile about half as long, unequal, ciliate: pistil tomentose, exceeding petals; stipe nearly as long and style half as long as the linear 12-ovulate ovary.—Banks of Rio, Rubeleruz, Depart. Alta Verapaz, alt. 2,500 feet, April, 1886. (Ex Pl. Guat. cit. 896.)

Bauhinia Pansamalana. *(§ Casparia DC.)*—Smooth throughout: stipules and intrastipular spines minute, deciduous: petioles about 18 lines long, incrassate at each end; leaves coriaceous, entire, round-ovate to broadly elliptical, abruptly acuminate, 7-nerved, 5–7 inches long: racemes axillary and terminal, simple or dichotomous, exceeding petiole, 10–20-flowered; pedicels 8 lines long, recurved: flowers hermaphrodite: calyx in the bud linear, obtuse, entire, 9 lines long; in anthesis spathaceous, splitting into sepals at base only, reflexed: petals narrowly linear, tapering into a long claw, 10 lines long, the vexillar smaller: stamens united for a line or two in a sheath cleft to base; the fertile 3, equaling petals, anthers 2 lines long; staminodes intermediate with the fertile, half-connate, barbate within: pistil sigmoid, nearly equaling stamens; ovary pubescent in two lines, long-stipitate, beaked with a short stout style; stigma oblique, oval, a line long; legume coriaceous, flat, linear, 8–9 inches long, 9 lines

broad; seeds 9–12, oval, flat.—A tree 12–15 feet high with roseate flowers. River banks, Pansamalá and Sacolol, alt. 37–3800 feet, June, 1885. (Ex. Pl. Guat. cit. 681.)

Anneslia Quetzal. (*Calliandræ series Racemosæ* Benth. in Trans. Linn. Soc. xxx, 556.)—Glabrous, glaucescent: stipules persistent, reniform, amplexicaul, erect, cartilaginous, rubescent-pallid, flabellate-veined, 9–18 lines broad, three-fourths as long; petioles 12–18 lines long; pinnæ 1–3-jugate, 4–6 inches long; leaflets 6–8-jugate, obliquely oblong or oval, base dimidiate-cordate, dark-green above, pale beneath, 12–18 lines long, a half to two-thirds as broad, lower pairs reduced; odd leaflet sessile, linear-lanceolate, 5–7 lines long, pallid, deciduous: peduncles 3–5 from upper axils, or shorter and subverticillate in a terminal thyrsoid sessile raceme half a foot or more long; pedicels of 5-flowered umbels 2–3 lines long: calyx equaling pedicel, lobes rounded: corolla 6–7 lines long, splitting at length nearly to base into lanceolate striate petals: stamens 60–70, connate for half the length of petals, 2–2½ inches long, half an inch shorter than style, white; anthers glabrous: legume flat, narrowly oblanceolate, about 4 inches long by 8 lines broad; valves coriaceous, glabrous, margins much thickened.—The large leaflets with a small odd one resemble those of several *Macrophyllæ;* but the inflorescence is that of *C. Calothyrsus* Miq., *C. grandiflora* Benth. (both collected by Mr. V. Türckheim), and the Mexican *C. leptopetala* Fourn. The remarkable stipules seem to be approached by those of only one other species, the Brazilian *C. leptopoda* Benth.—Santa Rosa, Dept. Baja Verapaz, alt. 5,000 feet, July, 1887. (Ex. Pl. Guat. cit. 1324.)

Triolena paleolata.—Stem ligneous, ascending, nearly simple, terete, about a foot high; beset with paleacious hairs, as are the petioles, nerves and margin of leaves, articulations of pedicels, and conspicuously the calyxes: leaves membranaceous, glabrous, pale beneath, ovate-lanceolate or lanceolate, 3–5-nerved from the small cordate base, triplinerved above, erose-denticulate; the larger one of each pair 4–6 inches long, a third to a half as broad, petiole 1–2 inches long; the other about a half smaller, shortly petioled: racemes from the uppermost 1–4 axils, 8–11-flowered, rhachis in fruit 1½–2 inches long and about equaling peduncle; pedicels scarcely a line long: calyx-lobes triangular-subulate, equaling tube: petals 5 lines long, 3 lines broad, pink: appendages

of greater stamens 2–3, clavellate-tipped, one-third longer than the uniporose anthers: capsule shortly obpyramidal, acutely triquetrous, 3 lines broad; seeds obconical, muriculate, pale with a red aril.—Damp rocks in the Pansamalá forests, alt., 3,800 feet, Aug., 1886. (Ex. Pl. Guat. cit. 726.)

Myriocarpa heterostachya. (*M. heterospicata*, BOT. GAZETTE, xii. 133.)—Monœcious and diœcious.—More recent specimens exhibit male and female spikes borne on distinct plants, as well as in distinct axils of the same plant.—Forests of Pansamalá, alt. 4,000 feet, Jan., 1887. (Ex. Pl. Guat. cit. 366.) The opportunity is seized to correct also the hybrid name first given.

Baltimore, Md.

Uncinula polychæta B. & C.

S. M. TRACY AND B. T. GALLOWAY.

Although this species has been known for more than ten years, it is believed that an attempt to reconcile the differences in published descriptions, with the addition of such facts as have been noted in a recent examination of fresh specimens collected on Sand creek, five miles east of Starkville, Miss., will be of interest to mycologists.

The most important bibliography of the species is here given. The earliest published description is by Berkeley and Curtiss, in *Grevillea*, vol. iv, p. 159, 1875–76, as follows: "*Uncinula pleochæta*. Perithecia scattered, appendages about 28, 1½ times longer than the diameter of the perithecium, hyaline. On leaves of Celtis occidentalis. Carolina. No. 5619." In Saccardo's *Sylloge Fungorum*, vol. i, p. 9, occurs the following (translation): "*Pleochæta*. Saccardo and Spegazzini. Michel. ii, p. 373. Perithecia imbedded in the mycelium, globose-lenticular, without aperture, texture subcoriaceous, parenchymatous, appendages very numerous, radiating, clavate, straight, simple, forming a hyaline band. Asci clavate, two-spored, spores rarely oval, without septa, sub-hyaline. Appendages very close together, straight, subhyaline at the base, asci smooth, etc. Separated from Erysiphe and Uncinula. *P. Curtisii*. Sacc. and Spez. Fung. Arg. Pug. ii, p. 44. *Erysiphe* and *Uncinula polychæta* Berkeley and Curtis, Grev. 1876, p. 159. *Uncinula Lynckii*

Spez. Fung. Arg. Pug. ii, p. 17, no. 54. Mycelium hypophyllous in orbicular whitish spots, perithecia scattered, appendages (about 28) half the diameter of the perithecia, hyaline; asci nodulose at the base, 80–90 × 25–30 μ, two-spored; spores nearly oval 25 × 17 μ, hyaline. Occurring on leaves of Celtis Talœ and C. occidentalis from Buenos Ayres. April, 1880. (Spez.) Alabama and Carolina. (Curtis.)"

M. C. Cooke, in "Notes on Perisporiaceæ of Saccardo's Sylloge Fungorum," published in *Grevillea*, xi, 1882, p. 35.

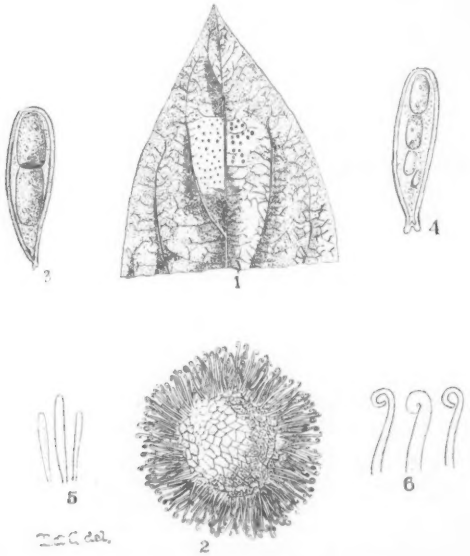

Fig. 1. Part of leaf, showing spot of *U. polychæta* B. & C. 2. Perithecium. 3. Two spored ascus—common form. 4. Four-spored ascus. 5. Clavate appendages from immature perithecium. 6. Curled tips of appendages from mature perithecium.

takes issue with Saccardo on the formation of the new genus *Pleochæta*, and insists that *P. Curtisii* Sacc. and Spez. is "a true Uncinula, with numerous appendages curled at the tips, just as in U. adunca, except that they are thickened upwards so as to be clavate;" and therefore it ought not to be adopted "as the type of a genus with straight appendages."

The *Journal of Mycology*, 1886, p. 43, says:

"*Uncinula polychæta* B. & C.—In the description of this species, published in *Grevillea*, vol. iv, p. 159, and in Sac-

cardo's *Sylloge*, vol. i, the number of appendages is said to be "about 28," and the number of asci is not stated. In a recent examination of South American specimens from Prof. Spegazzini, I found a perithecium (the only *mature* one examined) containing 50 two-spored asci, and surrounded by over 200 appendages, 114–120 × 6–7 μ, hyaline, continuous, with attenuated, involute tips. Perithecia 225–230 μ in diameter.

"The foregoing notes are also applicable to specimens of *Uncinula polychæta* B. & C. in Ravenel's *Fungi Caroliniani*. The species is remarkable for its numerous asci and appendages, but it seems unnecessary, on this account, to make it the type of a new genus. Possibly, the statement that the number of appendages is 'about 28' is a typographical error for 'about 228,' which would be nearer the actual number."

In his *Additamenta*, published in 1886, Saccardo, however, still adheres to his original name of *Pleochæta Curtisii* Sacc. and Spez., even in a description apparently re-written from that in the *Journal of Mycology*, as follows: "Perithecia 225–230 μ in diameter, appendages numerous, about 200, hyaline, continuous, apex attenuated, incurved, asci about 50, two-spored."

In the specimens before us from Mississippi and Carolina, the mycelium is hypophyllous, in irregular whitish spots, as shown in fig. 1. Usually, but one such spot occurs on a leaf, and the mycelium is by no means abundant. The perithecia, which are irregularly scattered over the mycelium, are much larger than in any other American Uncinula, fresh specimens, collected in November, measuring 275–280 μ in diameter. U. spiralis is usually 85–100 μ, and U. circinatæ sometimes reaches 175 μ. Older specimens of U. polychæta measured 250–275 μ. The appendages vary from 250 to 300 or more, Berkeley and Curtis' "about 28" probably being a misprint for "about 280." On immature perithecia the appendages are all clavate, as described by Saccardo, but on mature specimens they become longer, 122–150 μ; the clavate form gradually merges itself into the coiled attenuate tips shown in fig. 6. Our material was abundant, and we found this change in form exhibited on every leaf examined. The "appendages clavate" of Saccardo and the "appendages curled at the tips" of Cooke are entirely harmonized by this knowledge.

The asci are broadly clavate, sometimes nodulose at the base, wall rather thick, quite regular in shape, and uniform

in size, hyaline: from 50 to 62 in each perithecium. Spores usually two, oval, sub-hyaline, nearly filling the ascus. Sometimes three or even four spores are found in an ascus. When three occur in an ascus two are of nearly the usual size and the third quite small, and when four occur all are small.

Department of Agriculture, Washington, D. C.

BRIEFER ARTICLES.

Plan of a botanical laboratory—In the GAZETTE for November, 1887, Miss Lillie J. Martin published a plan of a botanical laboratory, which I

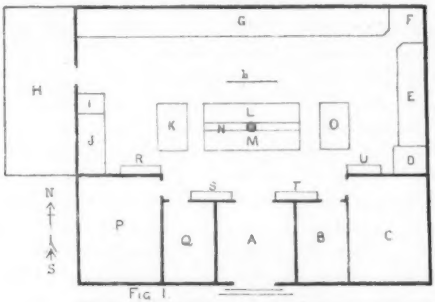

FIG. I

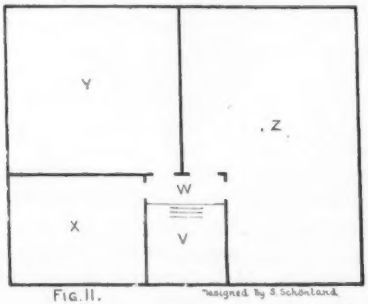

FIG. II.

Designed by S. Schönland.

Size 50 x 40 ft. Fig. I, ground floor, *A*, entrance hall, with stairway; *B*, dark room; *b*, blackboard; *C*, physiological laboratory; *D*, hood; *E*, tables for three advanced students; *F*, writing-desk; *G*, tables for twelve elementary pupils (there is room also for a second row); *H*, green-house; *I*, oven; *J*, sink; *K*, table for general use; *L*, for large bottles with spirit, distilled water, embedding apparatus, etc.; *M*, table for chemical work; *N*, racks for reagents; *O*, table for microtomes; *P*, professor's room; *Q*, room for chemical balance and other delicate instruments; *R*, *S*, *T*, *U*, cases.

Fig. II, second floor, *V*, stairway; *W*, landing; *X*, library and reading-room; *Y*, lecture-room, with cases for diagrams, etc.; *Z*, large room in which models, dried specimens and specimens in spirit are kept. This room may be provided with a gallery.

fear will not be found acceptable by a great many botanists. I shall not criticise it in detail, but I may be allowed to state that the most eminent teachers of botany insist on having their laboratories conform to the following principles:

1. The laboratory should not be used as a lecture-room. Only occasional help by drawing on a blackboard should be given to the students, whereas systematic teaching is to be done in a room specially fitted for the purpose.

2. Models, dried specimens and specimens in spirit should be kept in a separate room, from which they can easily be taken into the lecture-room.

3. Only a few important text-books should be admitted to the laboratory. All other books and periodicals may be consulted in the library.

4. Chemical work should not be done on the same tables on which microscopical work is carried on. Whenever fumes dangerous to microscopes are given off in a chemical process a good hood is necessary.

In order to meet all these requirements I submit another plan. I have not indicated any windows, but have not left them out of account in my calculations. In the laboratory they ought to be as large and numerous as possible, but the exact position of them here and in all other rooms ought to be arranged with an architect, though not entirely left to him. At *R*, *S*, *T*, *U*, spaces are left for cases to hold material for cutting, bottles, mortars, funnels, etc. In the middle of the laboratory an iron column is to support the ceiling. The doors are indicated on the drawing, which will make the general arrangement of a laboratory as I should like to have it much clearer than I could make it by words. I refrain from going into details, as I shall have an opportunity of doing so in a future paper for the GAZETTE on the Oxford laboratory. To prevent misunderstanding, however, I have to add that the plan of the Oxford laboratory is entirely different from the one I have designed.—SELMAR SCHÖNLAND, *Botanic Garden, Oxford.*

Effect of the wind on bees and flowers.—It must be a matter of common observation that the wind has an influence on the flight of insects and birds. While in continued flight they seem to have little difficulty in moving with the wind, in rising and lighting they use their wings with more precision when their faces are turned against it.[1] Thus, if a bee comes with the wind, it turns when it visits a plant and lights on the leeward side. If it is visiting flowers regularly, it moves against the wind, since it can rise and light more easily by so doing.

A simple effect of the wind on flowers is that it carries the odors so that they are most readily perceived on the side toward which it blows.

[1] In Florida I saw many buzzards and vultures lighting with their faces to the wind. When disturbed, they rose against the wind and swung around and lighted with their faces toward it. If one passed a few feet beyond where he wished to light, he would make a circle of 200 yards rather than turn with his back to the wind.

Then the wind catches in the leaves and flowers and bends the stems and branches, so that the flowers are most conspicuous on the same side. I have seen the heads of Helianthus grosse-serratus turned to the northeast by a southwest wind, and the bees were flying southwest, and thus approached the heads in front. But the flower-stalks often whip about, making it hard for an insect to light. It must be tantalizing to a bee for the head to fly up and leave her suspended in mid-air.

In Physostegia the flowers are nearly sessile, so that they are not easily shaken by the wind, and when turned to any position remain in it. Prof. W. W. Bailey says:[2] "The flowers are made to assume their definite position by friction of the pedicels against the subtending bracts. Remove the bracts and they at once fall limp. This was shown me by Prof. Goodale in 1879." With the breath one can easily blow the flowers to the opposite side of the spike.

Prof. Coulter[3] has observed how the movement of the flowers is useful in bad weather by turning their mouths from a driving rain, but I think it is also advantageous in fair weather in adaptation to the flight of insects.

In September, 1886, I found several hundred stalks of Physostegia Virginiana arranged in a long patch along the railroad. The southwest wind was blowing up the road, and the flowers were all turned away from the wind, so that they looked to the northeast. As I walked through the patch from the southwest, I passed nineteen humble-bees, Bombus Pennsylvanicus[4] (females and workers), all going against the wind, except two, which did not visit the flowers regularly but flew away to the northeast. Returning, I overtook the bees going against the wind, but passed none going with it. Keeping their faces to the wind, they would move from side to side, or even let themselves back to a spike they were about to leave behind. It was interesting to observe that, while the wind required the bees to face it, it compensated for the disadvantage by carrying the odors to them and by turning the flowers so that they were more easily seen and visited by them.—CHARLES ROBERTSON, *Carlinville, Ill.*

Conditions of Assimilation.[5]—In this paper Dr. Pringsheim notes the limitations of the prevalent method of gas analysis, and has striven by direct observation of the protoplasm to determine the seat and relations of the various functions. It seemed likely that the observation of protoplasmic movements in varying conditions of light and darkness, and in partial or total removal of oxygen, would afford a suitable starting

[2] BOT. GAZ. vii, 122.

[3] BOT. GAZETTE, vii, 111.

[4] The flowers are also visited by Apathus clatus (frequent) and Colias Philodice (once).

[5] Dr. N. Pringsheim has communicated to the Prussian Academy of Sciences a preliminary account of his researches on the dependence of assimilation in green cells on the presence of oxygen and on the locality where the oxygen formed in assimilation actually originates. These researches are so important that we present the following abstract by Prof. A. W. Bennett, from the *Jour. Roy. Mic. Soc., Dec.*, 1887, p. 992.—[EDS.

point for his researches. Previous experiments had forcibly suggested that observed differences in the assimilative energy did not in any way depend on differences in the number of chlorophyll-bodies, or on the abundance of chlorophyll within these, but on the oxygen respiration of the protoplasm. This point Pringsheim sought further to investigate.

It has been long known that the green cells can break up CO_2 in the absence of oxygen, where the CO_2 is mixed with some innocuous vgs. It is also known that protoplasmic movement is dependent on the presence of oxygen. If this be so, the protoplasmic movement in a green assimilating cell, in a medium free from oxygen, should not come to a standstill as long as it is illuminated, and the conditions of carbonic dioxide analysis fulfilled. With these facts in view, Pringsheim tried by experiment to answer the question whether a plant normally assimilating would cease to assimilate, without any alteration of its chlorophyll relations, if it were deprived, even for a short time, of the oxygen which is essential for respiration and plasmic movement, and whether it would recommence to assimilate whenever fresh oxygen was supplied. His experiments answered this in the affirmative.

The naked terminal cells of Chara leaves were placed in suspended drops in a microscopic gas chamber; oxygen was, as far as possible, excluded, a continuous stream of CO_2 and hydrogen passed through, and the amount of light caused to vary. In darkness the rotation of the protoplasm gradually ceases, the length of time before stoppage varying with the degree to which oxygen is successfully excluded, with the specific nature of the cell, and with the mass of protoplasm. The final result is a state of complete "asphyxia," when the cell is dead, though still normal morphologically. If the cells be taken just before asphyxia, just when the protoplasm is ceasing to move at all, it will be found that they are no longer able to assimilate. They are still quite normal; but if now placed in an illuminated chamber, and supplied as before with carbonic acid, the rotation will not return. A little free oxygen restores the original state; but without this, in spite of the presence of light, chlorophyll and CO_2, no oxygen is formed. This state Pringsheim calls "inanition" or "Ernährungs-ohnmacht." What has been noted in regard to its occurrence goes to show the dependence of assimilation on the absorption of oxygen.

But it is also a fact that the same phenomena of inanition occur when cells in similar circumstances are kept continuously in the light. Repeating the above experiment with continuous illumination instead of darkness, Pringsheim again observed the stoppage of rotation, and with it the cessation of the liberation of oxygen. The absence of free oxygen is again the condition of the cessation of function; if a small quantity be introduced the life revives, at least if inanition has not gone too far.

How is this to be explained in terms of the generally accepted theory

of assimilation? *If the disruption of carbonic dioxide within the cell furnishes oxygen directly*, how can any assimilating cell suffer from want of oxygen? Pringsheim does not admit the usual assumption italicized above. His opinion is that the analysis of the CO_2 in assimilation does *not* directly furnish oxygen, but that some other substance is formed, which, passing diosmotically to the surface, breaks up and liberates free oxygen. He criticises the usual arguments based on the results of gas analysis. What the substance is which forms oxygen at the surface he is not prepared to state.

If this be so, the breaking up of CO_2 and the liberation of O are two processes, distinct both in space and time, the one occurring within the cell, the other at its surface. This view is supported by reference to the peculiar liberation of oxygen exhibited in darkness by both green and unpigmented cells toward death. The bacterium-method proves this fact incontestably. This liberation of oxygen in darkness, quite independent of contemporaneous assimilation, may be termed "intramolecular liberation of oxygen," and, according to Pringsheim, the normal liberation is an essentially similar process, resulting from the disruption of an exosmosing substance.

He advances other arguments to show that we are not warranted in concluding, as has hitherto been done, that the presence of light, chlorophyll and CO_2 exhausts the conditions of assimilation, and that in estimating its amount no other factors but light-energy and the absorption of light by the chlorophyll have to be taken into account. Assimilation is, on the contrary, a physiological function of the protoplasm, and, like movement, depends on the presence of free oxygen. Physiologists will look with interest for Pringsheim's detailed account of his investigations on this important subject.

The proposed Botanical Exchange Club.—The committee appointed by the Botanical Club of the A. A. A. S. at the New York meeting to act for the club in the formation of a Botanical Exchange, after considerable correspondence and the consultation of the rules and regulations of similar organizations abroad, is now in a position to submit to the members of the club certain tentative propositions, on which individual opinion is solicited.

The regulations of the Botanical Exchange Club of the British Isles, published in pamphlet form at Manchester in 1886, seem applicable to our needs, with certain necessary modifications. In order to bring these before the botanists of the country, a synopsis of them is here presented, arranged with reference to America instead of Great Britain.

1. The object of the club will be to facilitate the exchange of herbarium specimens of American plants, specially of rare species and varieties. The conditions of membership to be that each member shall furnish a parcel of specimens annually, and pay a yearly subscription of a

sum not to exceed ($3.00) three dollars, to meet the expenses. Members will be entitled to a share in the distribution of specimens made in the early part of the year following that in which their subscriptions and parcels were sent.

2. The annual list of desiderata will be made up by combining those of all the members of the club, and then be printed and sent to every member. Each individual list must not exceed a certain number of species annually, for if unlimited the printed list would be too voluminous for practical use with our very extensive flora, at any rate for a number of years. The determination of the annual number of desiderata will require further consideration.

3. Some member will have to act as distributor each year, either voluntarily, or, if no one is found willing to act without recompense, provision will have to be made for employing a distributor at a small salary. The plan as here outlined would not necessitate very much work, and it certainly would be of an interesting nature. The committee will be pleased to receive communications relative to this.[1]

4 It will be necessary to adopt some one check-list as the official one of the club, and this must either be used in sending lists of desiderata by marking the species desired, or if a reliable numbered check list can be procured, the list of numbers might be sent. This is also a question for further consideration. It has been the experience of the British Club that manuscript lists of desiderata should not be received.

5. Each species should be represented by a number of specimens to be determined when the probable number of members shall be ascertained. It is not necessary to emphasize at this time the necessity for complete and satisfactory specimens being furnished, with appropriate labels.

The British Club in 1886 had a membership of fifty-eight, and has been in successful operation for a number of years. It would seem certain that at least an equal number of American botanists would consider it advantageous to join a similar organization.

Suggestions regarding the matter here presented and applications for membership should be sent to the chairman of the committee, Dr. George Vasey, U. S. Department of Agriculture, Washington, D. C.

THE COMMITTEE.

Phacelia heterosperma.—Annual, a foot or less high, with erect branches, glandular and viscid, the foliage and inflorescence with sparse short and viscid hairs: leaves few on short petioles, ovate, an inch long, with a few coarse angular teeth, or the basal ones nearly entire: flowers in strict spiciform racemes, at length elongated and loose: corolla com-

[1] Dr. Vasey writes that Commissioner Colman has consented, if it be deemed advisable, that the Botanical Division of the Department of Agriculture take charge of the exchanges and distribution without expense to the members of the club. N. L. B.

panulate, 3–4 lines high, little exceeding the spatulate sepals, light purple with yellowish base: the unequal filaments and short cleft style included: capsule oblong, 3 lines high, exceeded by the sepals; seeds numerous (40–50), light brown, deeply pitted and variously angled or rounded. Of the *Eutoca* group.—In wet sand, banks of Rock creek, borders of the Mojave desert, Los Angeles Co., Calif., June, 1887.—SAM'L B. PARISH, *San Bernardino, Calif.*

EDITORIAL.

THE DEATH of Dr. Asa Gray removes from American botany one who can have no successor. His work may be continued, but his commanding position can not be attained by any other. The circumstances which gave him such a grasp upon men and materials will not be repeated. The greatest name in American botany is the unanimous verdict of his countrymen. But his most enduring monument is not this unanimous acknowledgment of his greatness as a botanist, but the loving remembrance of the kindly, helpful man, which is cherished in the hearts of more than one generation of botanists, none of whom he ever turned away unanswered, all of whom he considered as friends that must be helped. Two years ago the GAZETTE published, with his sanction and help, a biographical sketch; and it but remains now for us to pay our tribute of love and respect to one who has been taken away, full of years and honor, but still in the midst of his work. The loss seems an irreparable one, but his name will always be a guide and incentive to every American botanist.

THE ARTICLE by Dr. Minot in a recent number of *Science* regarding the unsuitableness of American microscopes for the use of biologists has provoked comment from nearly every American journal dealing wholly or in part with biology, and the verdict appears to be that some of the writer's points were well taken, although the statements may have been stronger than the facts will warrant. The rapid increase in number and size of biological laboratories brings about an increasing demand for a low-priced instrument adapted to certain kinds of work. This demand is met by German manufacturers, but is to a certain extent ignored by American manufacturers. The result is that probably half of the instruments now bought for biological purposes come from abroad, and the number would doubtless be greater but for the trouble and delay of importing. The subject is one that has often been discussed, but the present agitation is more general than at any previous time, and promises to be more fruitful, as it has aroused the makers to a show of defense. The American manufacturer takes pride in the handsome instrument which he turns out, and the only influence that is likely to be strong enough to

develop a permanent interest in the small plain instrument the biologist is asking for is a financial one. That there is an inclination to meet the rising demand is evident from the circular of inquiry sent out by Queen & Co. last year, from the construction of the "Harvard" stand by Bausch & Lomb Optical Co., which embraces some features of the foreign models, from the similar stand just put in the market by Bulloch, and from the tone of the replies already made to Dr. Minot's article. The old prejudice against American instruments, because American, has nearly passed away, and the investigator is now likely to buy where he can best and most easily meet his needs. On the other hand, if the instrument-maker will lay aside his prejudices against a plain instrument of superior workmanship, there will not long be grounds for accusation and controversy.

OPEN LETTERS.

Mutilation of flowers by insects.

On page 111, 1887, of the GAZETTE I suggested that botanists note all cases in which insects mutilate flowers for the purpose of securing the nectar; and that the insects be captured, and their scientific names be published with such notes. Professional duties have made it impossible for me to give much time to this class of observations, but have the following notes which may be of some value. I found that a majority of the corollas of a large number of plants (examined in several localities) of *Physostegia Virginiana* and *Mertensia Virginica* were slitted as described in the GAZETTE for October, 1886 and May, 1887. The only insect which I found doing this work was *Bombus Pennsylvanicus*. For nearly two months, during the past summer, I had under observation two large vines of two species of honeysuckle. In the first, the common woodbine, the corolla is deeply cleft, with the lips well turned back. This plant is deliciously fragrant, and, to my surprise, the only insects which visited it belong to the genus Halictus, apparently all the same species. All entered at the open mouth of the corolla. The flowers are proterandrous. In the second, the trumpet or coral honey-suckle, the mouth of the corolla is small and the short divisions not reflected. It is also proterandrous. This species was abundantly visited by the leaf-cutter or upholster bee (Megachile brevis), and one or more species of Halictus.[1] The leaf-cutter bee never enters the mouth of the corolla, but goes directly to the base, and shears out a round piece, usually near one-eighth inch in diameter; through this it extracts the sweets. It is sometimes necessary to make two or three openings before it gets to the right place. This operation is done as easily and quickly as one could do it with sharp scissors. In the majority of instances the piece cut out is allowed to hang by a little hinge at one side. Through this circular opening the Halictus enters and makes a more thorough search for the remaining honey.

[1] These small insects are commonly known as "sweat bees," from their habit of alighting on one's person while sweating freely and sucking up the perspiration. Mr. C. M. Weed, of the Ill. State Laboratory, kindly identified the insects for me.

In case the flower has not been visited by a Megachile the Halictus goes to the mouth of the corolla and enters in the usual way; but it usually alights on the base first and hunts for the artificial opening.

Mt. Carmel, Ill. J. SCHENCK.

An acknowledgment.

In the correcting of the proof of the paper on the ostrich fern, noticed in the GAZETTE for December, a paragraph stating under what conditions the investigations were made was inadvertently omitted. The work was done under the supervision of Professor V. M. Spalding, of the University of Michigan, to whom the author begs to offer this somewhat tardy expression of his thanks for the valuable assistance and encouragement received from him during the pursuance of the work.

Berlin, Germany. DOUGLAS H. CAMPBELL.

CURRENT LITERATURE.

Flowers and fruit of Sparganium and Typha.[1]

In this monograph Dr. Dietz has given the results of a comparative study of the development of the floral and fruit structures of Sparganium and Typha. It is a good model of those studies which are necessary before botanists can speak with any definiteness upon the relationships of plants; studies which should be greatly multiplied, and which furnish a vast and useful field of labor for our ever increasing army of botanists. Taking a group of doubtful relationships, the author has laid the foundation for a rational discussion of the subject, which he promises at some subsequent time. The vegetative structures are mostly alike, but the reproductive organs show notable differences. A radical difference occurs in the positions of the flowers themselves, those of Sparganium occurring upon secondary and tertiary axes, while those of Typha are upon primary and secondary axes. Every detail in the development of the floral parts is described and figured with that minuteness that seems to leave none of the anatomical details unrecorded. The greatest differences are found in the structures of the pistil, the most apparent of which is its bicarpellary character in Sparganium, and monocarpellary character in Typha. The formation of the integuments of the seed also differs widely. In conclusion, the author considers that, while there are enough characters in common to justify retaining these two genera in one order for the present, the differences are sufficient to indicate that there may be ordinal characters. This structural study shows that Sparganium is nearest to the Pandaneæ, while Typha shows relationships to the Aroideæ.

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[1] DIETZ, DR. SANDOR.—Ueber die Entwickelung der Blüthe und Frucht von Sparganium Tourn. und Typha Tourn. (Bibliotheca botanica, heft 5.) 60 pp., 3 plates. 4to. Cassel: Theodor Fischer, 1887.—8 marks.

Lessons in botany.[2]

Dr. Gray has been preëminently the teacher of botany in this country for half a century; not only in marshaling our hosts of North American plants into an orderly array, but, also, in imparting, by means of his text-books, the general principles of the science. No text-book has been more widely used than the one of which this is a revision; and nothing could be more appropriate than for the author himself to give a final revision, which has been long demanded by our rapid advance in knowledge. There can be no doubt that this is the best book for its purpose that we now have. Choosing for a title that of his first text-book, published over fifty years ago, the author presents, in that clear and simple style of which he is so great a master, the elements of botany which he considers are essential for beginners to know. In the preface he wisely calls attention to the fact that even this book should be considered more of a reference book than anything else, and that its technical names mean nothing unless applied. In fact, its legitimate use seems to be that of an extended and illustrated glossary, to be elaborated by the teacher and applied in the laboratory. If so useful a book is to be criticised, we would say that, although it is a vast improvement upon the edition it is meant to replace, there might have been some additional improvements that even conservatism will allow to the "cryptogamically-minded." The perpetuation of the word "nucleus" to express what we now understand by "nucellus" is a case in point, and must lead to a confusion of terms that is not helpful, to say the least. Many of the figures have served their day and generation, and might well have been replaced by others, not because the latter would have looked better, but because they would have represented facts (*e. g.*, those representing the anatomical elements of the fibro-vascular system, pp. 133–135). The figure of Oscillaria, p. 149, could surely have been bettered. On page 101, fig. 295 still conveys its old impression that pollen sacs are made by rolling up the leaf edges, an impression which a sentence added to the foot-note would have corrected. A remarkable slip is found on p. 104, where it is said that the pollen of pine "consists of three cells, of which the middle one is large, wholly empty, and light." Undoubtedly, the use of old figures is largely to be ascribed to the publishers. Although more concession to the results of modern botanical work might have been expected, the author may have been wisely conservative, and his justly great name insures a book that can be trusted.

Poisonous plants.

At the time the editorial was written which appeared in this journal a few months since on plants considered harmless by most persons, but thought to be poisonous by some, it was not known to the editors that a book covering about the ground there suggested had just been issued.

[2] GRAY, ASA.—The elements of botany, for beginners and for schools. (Lessons in botany, revised edition.) 226 pp., 589 figs., small 8vo. New York and Chicago: Ivison, Blakeman & Co., 1887.—$1.00.

The work[3] has since been sent for review, and can be commended as a carefully prepared account of the action of irritants upon the skin, especially those directly due to or derived from plants—such plants being generally spoken of as poisonous. Dr. White, the author, is professor of dermatology in Harvard University, and speaks with authority about the forms and degrees of inflammation and the subsequent development of the affection caused by each plant of which he writes. He has also called to his assistance a number of eminent authorities in botany, zoölogy, etc.

About fifty pages of the work are occupied with an account of irritants other than vegetable, but it is of the latter only that we shall now speak. Eighty-six genera of plants, mostly found in the United States, with one or more species each, are put into the list of "poisonous." The virulent kinds of Rhus naturally take the lead, and the series shades off into such apparently innocent but quasi-harmful plants as the delicate wind-flower, the earliest of the Anemones.

Forty pages are devoted to rhus poisoning—too much to be even summarized in this place. We turn with interest to the treatment of its etiology, and are somewhat disappointed to find that the latest reference is to work done in 1865. At that time Prof. Maisch, of Philadelphia, decided that the poisonous properties reside in a volatile acid which he called toxicodendric acid. No reference is made to Dr. Burrill's statement that the action is due to microbes, which he described and named. The bacterial theory has received some credence, even from careful medical writers (*e. g.*, Dr. Gradle in "Germ Theory of Disease," 1883), and a description of the microbe is included in systematic works (*e. g.*, Grove's 'Bacteria and Yeast Fungi," 1884), so that some notice of it would have been in place.

Many of the plants put into the indicated list, one might possibly say the majority, are usually looked upon as harmless, and the reader is treated to a succession of surprises quite as disagreeable in their way as if he were to discover that his respected, although it may be humble, acquaintances were being accused of petty misdemeanors. Thus, the list includes, to cite at random, arnica, beggar-ticks, fleabane, burdock, ox-eye daisy, mayweed, golden-rod and cocklebur. The way in which the poisonous effects are produced are as diverse as the plants which produce them. In some cases successful remedial agents are known.

As this is the first book of the kind, there is necessarily much omitted; for instance, no mention is made of the strong vesicating action of the juice of Euphorbia marginata, a fact well known to most persons who have had the plant in their gardens. The experience of nearly every one will probably suggest some items of additional information, and the author will doubtless be pleased to receive data of authentic nature from users of the work.

[3] WHITE, DR. JAMES C.—Dermatitis Venenata, an account of the action of external irritants upon the skin. 216 pp., 8vo. Boston: Cupples & Hurd, 1887.

A monograph on Stigmaria.[1]

Professor Williamson has done more, probably, than any other individual towards perfecting our knowledge of the structure and affinities of the plants of the coal-measures. Entering the field of palæontological science in 1833 as a contributor to the "Fossil Flora of Great Britain," by Lindley & Hutton, almost every year since has witnessed the production from his pen of papers of more or less extent, describing in detail the histology and relationships of carboniferous plants. The last is the elaborate and beautiful memoir before us.

Stigmaria ficoides is one of the most abundant and well-known plants of the carboniferous age. It is most frequently met with, however, in the form of inorganic casts of the scarred exterior or of the fistular medullary interior. As these casts were the only conditions under which it was known for a long time, the histology, and consequently the affinities, long remained in question. During the last half-century, however, specimens have been obtained from various localities in which the structure has been more or less clearly preserved, and through a study of these considerable light has been thrown upon the affinities of these curious plants.

Professor Williamson has spent the past twenty years in collecting the material upon which present results are based, and his is undoubtedly the most complete collection extant. These specimens, with the structure exquisitely preserved, come mostly from the districts around Oldham and Halifax, occurring in calcareous nodules imbedded in coal seams.

The results of a study of the histological elements in these specimens, briefly stated, are as follows: The medulla was composed exclusively of parenchymatous tissue, and early, by absorption or decay, became hollow. Into this fistular medullary cavity stigmarian or other rootlets penetrated, sometimes to the number of half a dozen, thus causing great complication. These specimens, to the casual observer, would appear to be traversed by fibro-vascular bundles, and by a study of such specimens several observers were led into error.

Surrounding the medulla was a vascular or xylem cylinder composed of transversely barred vessels or tracheïds. These tracheïds, arranged in bundles, did not preserve a longitudinally straight, but an undulating course through the stem, the undulating curves of one bundle being opposed to those of its neighbor on either side. "The result of the wavy undulations was that contiguous bundles alternately touched and separated from one another, inclosing, in the latter case, large, vertically elongated lenticular spaces, occupied by extensions of the medullary parenchyma which thus reached the bark. As the vascular cylinder grew

[1] WILLIAMSON, WILLIAM CRAWFORD.—A monograph on the morphology and histology of Stigmaria ficoides. (The Palæontographical Society, volume for 1886.) 62 pp., 15 plates. London, 1887.

exogenously each new superadded vessel followed exactly the undulating course of those upon which it rested."

The cortex consisted of three layers, which pass more or less gradually into each other. The outer is composed of parenchymatous cells, which are without special order of arrangement; the inner of a zone of cells arranged in radial parallel lines; while the middle is a transition with slight distinguishing characters, from the one to the other.

The origin of the root-bundles which run to the rootlets is as follows: Some of the vessels of the xylem cylinder, or usually, in the initial step, one vessel, instead of pursuing the undulating course, is deflected outward and forms the basis of one of these bundles. Other vessels are added to it from time to time, and it thus increases in diameter. Where these emerge from the bark a lenticular scar is produced, giving rise to the well-known stigmarian characters.

Without going further into a description of the histology, the conclusions of Professor Williamson may be summed up as follows: Stigmaria were *always* roots, and, moreover, were roots alike of Lepidodendra and Sigillariæ, which primeval Lycopodiaceæ were undoubtedly the remote ancestors of the modern Lycopodiaceæ. This view is strengthened by the analogy which is shown to exist between stigmarian roots and the roots of modern Lycopodiaceæ, particularly of Selaginella and Isoetes. The latter, like Stigmaria, has a fistular medullary cavity which is produced by the early absorption or non-development of the delicate parenchyma which ought to be present. The origin of the rootlets is also similar.

F. H. KNOWLTON.

Diseases of the grape.

Two important works on the diseases of the grape have recently appeared in France. A small work on the black-rot,[5] by MM. Viala and Ravaz, is a revised and somewhat enlarged edition of the treatise by the same authors which appeared a little over a year ago. A number of the figures in the present edition are new, and are especially clear illustrations of the botanical characters of the fungi they represent. The first sixty pages are devoted to the discussion of the black rot, with a comparative study of other forms of grape-rot which have not always been clearly distinguished from it. Considerable space is devoted to pointing out the distinctions between black rot and anthracnose, which "have been and are yet confounded with each other in publications."

The first illustrated description of anthracnose published in this country was that which appeared in Bulletin 2 of the botanical division of the United States Department of Agriculture, published last year under the direction of the commissioner of agriculture. In this publication the distinctive characters between the black rot and the rot of anthracnose

[5] VIALA, PIERRE, and RAVAZ, L.—Le Black Rot et le Coniotherium diplodiella. (Second edition.) 88 pp., 1 colored plate and 15 wood-cuts, small 8vo. Montpellier and Paris, 1888.

were clearly pointed out. There has doubtless been some confusion in this country in the use of popular terms for these diseases; but the term "bird's-eye-rot" has been applied to anthracnose on the berry, and may well be generally adopted, as it is peculiarly descriptive and certainly would never be applied to any other variety of grape-rot.

The work concludes with a bibliography of the subject, and although a number of American authors are cited the greater number of papers appear to have originated in France. Some important observations made by Prof. Viala while in this country the past summer are included in the book. F. L. S.

The second of the works referred to is a much larger volume;[4] a larger volume in fact than most persons would suppose could be written in a concise and well digested form on the diseases of the grape. The treatise is written from a practical stand-point, the author, Dr. Viala, being professor of viticulture in the National Agricultural School of Montpellier, France.

Half of the volume is devoted to the two mildews, one growing upon the surface (Oidium Tuckeri), and the other (Peronospora viticola) within the leaves and other parts of the host. There are forty-five pages on black rot (Physalospora Bidwellii), and as many on anthracnose (Sphaceloma ampelinum); while sixteen pages on melanose, a poorly recognized disease caused by Septoria ampelina, and the "American oidium," Uncinula spiralis, completes four-fifths of the volume. The remaining fifth of the volume enumerates 275 species of fungi which have been found growing upon the grape, with notes on a few of them, and gives brief descriptions of diseases not due to parasitic fungi. This long list of fungi is divisible into three categories, including 150 accidental, 100 saprophytic, and 25 parasitic species. It is the latter sort that more especially interest the cultivator and the economic botanist.

The half-dozen diseases which form the bulk of the volume are mostly of American origin, and all occur in the United States, unless it be the imperfectly known European oidium. The author's treatment is logical, concise and well-directed, and the illustrations ample and satisfactorily executed. It is to be hoped that before long similar works on the more important plant diseases will be written for this country.

An outline of the topics under black rot, although not the longest subject, will give an idea of the author's method. After a few words about the name, and a bibliography in which are the names of Andrew Fuller, Robert Buchanan, Bush and Meissner of Missouri, George Engelmann, Geo. Husmann, J. Strong, Wm. Trelease, J. B. Ellis, F. L. Scribner, and E. C. Bidwell, all American writers, a history of the disease in France and in America is given, followed by a description of the external charac-

[4] VIALA, PIERRE.—Les Maladies de la Vigne; avec une étude des appareils de traitement par Paul Ferrouillat. (Second edition.) 462 pp., five colored plates and 200 wood-cuts, 8vo. Montpellier and Paris, 1887.

ters by which it may be recognized. The part devoted to the botanical characters of the fungus shows the species to be very polymorphic. The indebtedness of the author to the studies of Prof. Scribner, of the United States Department of Agriculture (published in this journal for November, 1886, and elsewhere), is acknowledged, especially his indebtedness for the account and illustrations of the perithecia, which have, up to the present time, only been observed in this country. The subject is appropriately closed with full details of all effective means yet known for combating the disease.

NOTES AND NEWS.

MISS SUSAN M. HALLOWELL, professor of botany at Wellesley College, is pursuing studies in the laboratory of Dr. Kny at Berlin.

DR. J. H. OYSTER, of Paola, Kansas, has published his new catalogue of North American plants. It contains 125 pages and an index of genera. The price is $1.25.

"TIMBER, and some of its diseases," is the subject of a series of illustrated papers by H. Marshall Ward in *Nature*, beginning with issue of December 22, 1887.

MARCUS E. JONES gives a very interesting description of the flora of Utah, in a four-page pamphlet, said to be a reprint from Tullidge's magazine, *The Western Galaxy*, for March, 1888.

THE VOLUME on British Discomycetes by William Phillips, F. L. S., which was announced more than two years ago, has recently appeared as a number in the International Science series.

EDWARD L. BERTHOUD, a well known botanist and engineer of Colorado, is making a botanical excursion into Lower California, not only along the coast, but into the interior, from which we expect some interesting results.

A SOCIETY for the promotion of the knowledge and cultivation of Cacti and other succulent plants has been established at Antwerp, under the title of "Vetplantenkring." Any one interested in the subject can address the secretary, Mr. T. Havermans, Rue Jésus, 46, Antwerp.

DR. ANTON DE BARY, Professor of Botany in the University of Strassburg, died, after a brief illness, on the 20th day of January, in the fifty-seventh year of his age. The GAZETTE will publish next month a sketch of his life and personal traits from the pen of a former pupil, Dr. F. B. Power, of the University of Wisconsin.

EDWARD S. BURGESS has published a little guide to the student in botany for his use in the Washington (D.C.) High School. It shows a commendable effort to pursue the study of botany in the right way, even in high schools, and probably pushes the subject as far as is consistent with the time and appliances at command.

DR. ALEXANDER DICKSON, Professor of Botany in Edinburgh University, died December 30, being seized with a sudden illness while on the ice, engaged in his favorite pastime of "curling." He was 51 years of age. A biographical sketch in *Nature* (January 5) says that by his death the world loses one of its best morphologists.

NEW SPECIES of grasses are described by Dr. Geo. Vasey and Prof. F. L. Scribner in the *Bull. of Torr. Bot. Club* for January. They are a Muhlenbergia and a Sporobolus from Arizona, a Deyeuxia and a Bromus from Montana and the northwestern mountain region, two species of Poa and four of Alopecurus from Oregon and the northwest.

THE January number of the *Journal of Mycology* gives the usual variety of contents, but appears in a blank cover. There are 35 species added to the formerly printed list of the Ramulariæ and Cercosporæ of the United States, and 15 new species of *fungi imperfecti* are described. The February number will be delayed and issued with the number for March.

THE BOTANICAL SECTION of the biological society of Washington, at their first monthly meeting (January 4), presented the following programme: Recent progress in the study of the fresh-water algæ, E. S. Burgess; A case of sewer obstruction by tree roots, F. H. Knowlton; Some fungi of the arid regions, S. M. Tracy; Gloeosporium of the wax bean and Asteroma of the rose, Miss E. A. Southworth.

A WINTER course of four lectures before the Amateur Botanical Club of Washington was as follows: Prof. Miles Rock on the Guatemala forests, Prof. J. W. Chickering on the flora of Alaska, Prof. Edw. S. Burgess on the fresh-water algæ of the District of Columbia, and Dr. George Vasey on some important medical plants. The club is in a prosperous condition, having forty members and a good attendance at its regular meetings.

AN ABSOLUTELY NEW VEGETABLE is a rare thing to chronicle in these days, but such a thing falls to the lot of the *Gardener's Chronicle* (January 7). It is a tuber developed by a Chinese Labiate, said to be a Stachys. The tubers are borne at the ends of underground branches exactly as in the potato, and are also marked by buds, or "eyes," at the nodes. The plant is said to be hardy, is of the easiest possible culture, and produces the tubers in great profusion.

THE NOMENCLATURE of Nymphæa is further considered by Mr. James Britten in *Journal of Botany* (January). Enlarging upon Mr. E. L. Greene's discovery (*Bull. Torr. Bot. Club*, Sept., 1887), he gives still more convincing proofs that our nomenclature of water-lilies must be changed. Nymphæa should be *Castalia* Salisb., and Nuphar is *Nymphæa* L. The results upon our American forms are as follows: Nymphæa odorata becomes *Castalia pudica* Salisb.; Nuphar advena becomes *Nymphæa advena* Soland., and so on.

GARDEN AND FOREST is the name of the new journal for which the name of "Sylva" was first proposed. The first number will be issued this month. The editor-in-chief, Prof. C. S. Sargent, will be assisted by Dr. W. G. Farlow in the department of cryptogamic botany and plant diseases, Dr. A. S. Packard in entomology, and Mr. W. A. Stiles as managing editor. Many eminent writers have signified their willingness to contribute, and there is promise of an auspicious beginning. It is to be a weekly at four dollars a year.

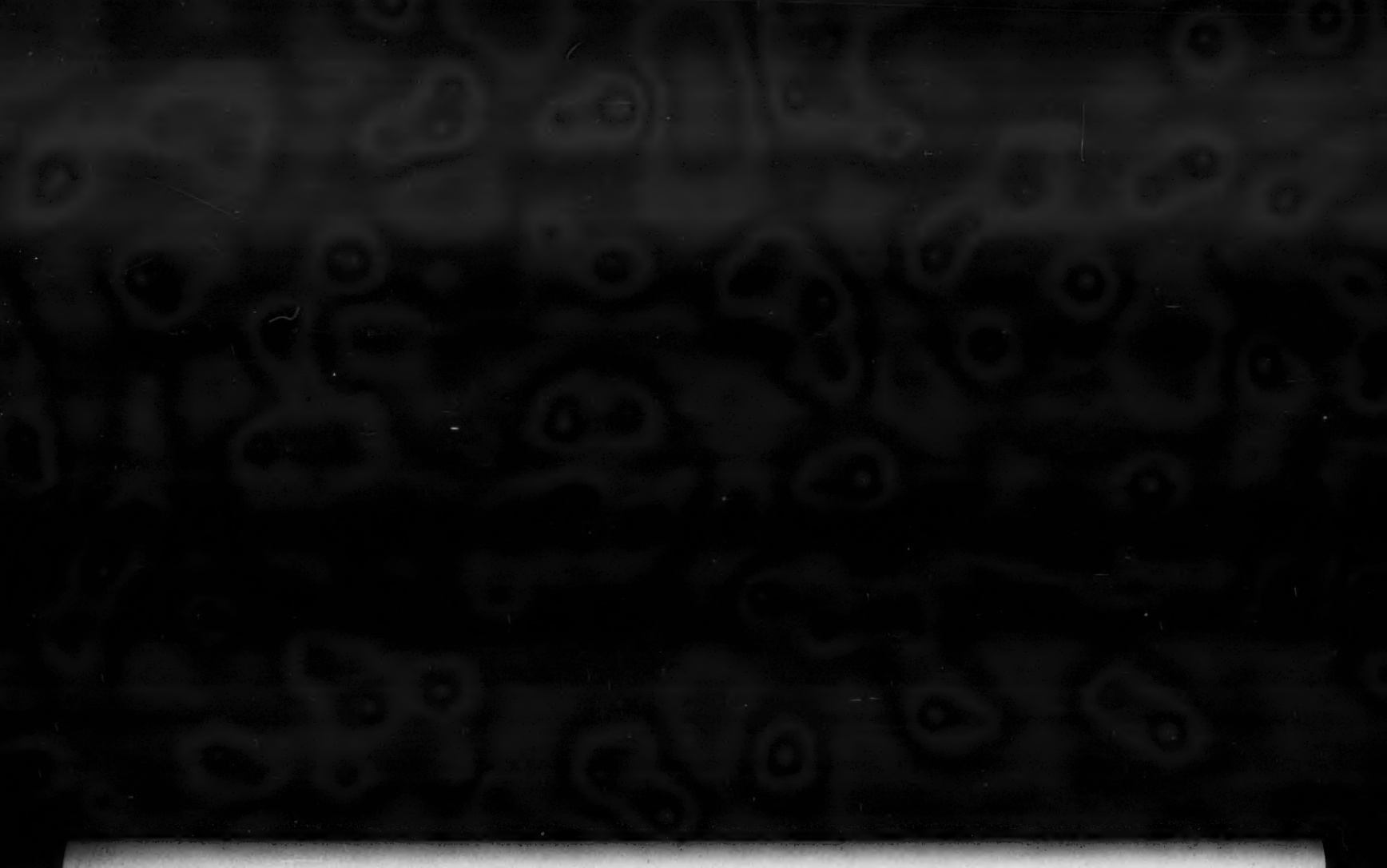
THE INFLUENCE of forests upon rain-fall is a much-discussed question. Mr. Henry Gannett, in *Science* (January 6), treats this subject in a tabulated way, giving the rain-fall through a long series of years over the regions where one would expect a diminution from "deforesting." His

conclusion is, "it seems idle to discuss further the influence of forests upon rain-fall from the economic point of view, as it is evidently too slight to be of the least practical importance. Man has not yet invented a method of controlling rain-fall."

FREDERICK BRENDEL has distributed a pamphlet of about ninety pages, entitled "Flora Peoriana." It is a careful and painstaking presentation of the observations of thirty-five years upon the vegetation of a small area in middle Illinois. It is intended to show how local floras should be treated to be useful to phytogeography; how notice should be taken of soil and climate, to understand the vegetation of a certain floral district. It is packed full of useful information, and would serve as a guide to similar observations elsewhere.

FORMATION of starch by plants has been the subject of experiments recently conducted by Professors Ivey and Gray at the School of Agriculture, Canterbury, New Zealand. Peas, beans and wheat were used, and up to date the following results have been obtained, as given in *Gardener's Chronicle* (January 7): "Starch is least plentiful in leaves collected in early morning, more plentiful in those collected late in the afternoon, but before evening. The degree of sunshine has a direct effect on the rate of starch-formation; in continuous cloudy weather starch is formed by plants but very slowly."

"CONTRIBUTIONS to the life-histories of plants" is the title of a paper distributed by Mr. Thomas Meehan, a reprint from the *Proc. Philad. Acad.* It consists of observations of various kinds upon various plants. Amphicarpæa monoica is observed to have apetalous flowers upon the climbing as well as the trailing stems; these flowers produce a third form of pod, and are fertilized from the petal-bearing flowers. Cephalanthus occidentalis is shown to be close-fertilized by the rapid development of the style sweeping the pollen out of the anthers, after the manner of the Compositæ. In Amorpha canescens it is observed that the vexillum is remarkably tardy in development, in fact attaining its size and attractiveness after fertilization has been effected. In Oxybaphus hirsutus, also, nothing suggests any arrangements for cross-fertilization.

PROFESSOR PIERRE VIALA sailed for Europe on December 3, after a stay of some months in this country. One of the objects of his mission was to see if there was any species of Vitis growing wild in the United States on soils corresponding to the calcareous (chalk) soils of central France. He traveled through the southern United States, making special study of grape culture in California and Missouri. In Texas he gathered some interesting facts about the native species of Vitis, one species of which is likely to prove useful in France. Some forms of viticolous fungi were recognized not before recorded for the United States. He returned feeling that he had been most happily successful in the accomplishment of the purposes of his visit. His report will probably appear in France and in this country at about the same date, and will be a work of special interest to American viticulturists.

ERRATA.—On page 5, foot-note, for "1877" read 1887. On page 9, third and fifth lines from bottom: for "Gothic shaped" read L-shaped.